ordinary conditions of wear and tear, and as they undergo oxidation somewhat readily, they gradually perish and become rotten. Yet, as Messrs. Cross and Bevan point out, in the case of papers used for writing and printing, permanence is a first desideratum :—

> "Books and records have more than a passing value, and it is essential that they should be committed to pages suitably resistant both to chemical and mechanical wear and tear . . . *there is no public opinion in this country upon this important subject.* Where preferences for high-class papers exist, they are based rather upon æsthetic and other recondite considerations than upon any judgment as to composition and the relation of their constituents to the destructive agencies of the natural world. On this basis, while papers admit of a very simple classification into three main groups : (A) Those composed of the normal and resistant celluloses only—*e.g.* cotton, linen ; (B) those composed of celluloses containing oxidised groups or oxycelluloses—*e.g.* wood-cellulose, esparto and straw celluloses ; (C) those containing, in admixture with the above, ground wood or mechanical wood pulps (ligno-cellulose) . . . Class A stands beyond criticism. . . . fibres of Class B have been introduced in response to the enormously increased consumption of paper in this century. . . . their use in books is open to the very obvious objection that the books are more perishable. Of course, it is perfectly true that a large amount of literature is of the ephemeral kind, and in this province such questions as we have raised do not enter ; on the contrary, paper being very much cheapened by the use of these celluloses, a great advantage is gained. It must be insisted upon, however, that authors and publishers should have a definite judgment as to the papers to which they commit their productions, and it would be of the greatest utility to exhaustively investigate these particular celluloses from the point of view of their resistance to the natural processes of decay. Class C : The presence of ligno-cellulose is a more extreme departure from the sound basis of composition represented by Class A . . . papers of this class are only permissible where lasting properties are a question of no moment whatever. . . . The practice of loading papers with china clay . . . is also another of the causes which lead to disintegration of modern papers as compared with those of former days. There is, of course, the other side to this question, the addition of these mineral diluents having certain positive advantages not to be overlooked. The danger of any practices of this kind only enters when they are not measured at their proper utility. *Paper is largely taken for granted by consumers.* In a great many, perhaps the majority of cases, this uninquiring consumption is not attended with any serious consequences ; but, on the other hand, it is quite obvious that it is attended with dangers of a very grave character, when we are dealing with records of value for all time. This, of course, is largely a question for posterity, to whom we are handing down a literature produced upon grounds for the most part of mere commercial expediency. *It is high time, as we have said before, that a public opinion should be formed upon this subject,* and it can only be formed upon a recognised classification of papers, based upon the mechanical and chemical constants, which are determinable by laboratory investigation." (The italics are introduced by me.)

But there is a sunny side to Messrs. Cross and Bevan's disclosures, as they appear to offer a method of overcoming some of the difficulties introduced by the plethora of publications with which we are overwhelmed at the present day, and foreshadow a course of action by which readers of scientific papers might be greatly helped. If we remember that cotton cellulose is unaffected by aniline salts, which colour the oxycelluloses yellow to red, we can imagine what the result might be if all books worth preserving, and just those parts of our scientific papers which are really worth consideration, were printed on sound rag paper. On receipt of a journal, a light wash of aniline solution might be applied to each page : soon afterwards a rosy blush would pervade the greater number, only a few here and there, or those just at the beginning or the end of a paper, retaining their virgin purity of tone : we should at once know what was padding, copied from the note-book to produce an impression of much labour expended and of deep learning! Works could be avoided by budding authors who in the process of self-education had given birth to compilations to "satisfy wants" felt by themselves alone, and the choice of students restricted to trustworthy sources of information. And the joy of the reviewer would also be great, as he could ascertain what value author and publisher placed on a book, especially if a standard series of tints, corresponding to the several varieties of paper, had been agreed to ; moreover, it would not be necessary to read reviews, and advertisements could be curtailed—as the words "Printed on Class A paper" would serve as a recommendation far better than any garbled "Opinions of the Press." I do not propose to protect the idea, but offer it freely to our Royal and other Societies, although I am aware that a patent is said to be a good advertisement, and the best means of enforcing use. Indeed, I trust that, in making the suggestion, I am but showing that I have derived profit from Messrs. Cross and Bevan's invaluable book, which is most properly printed on Class A paper.

As they truly remark at the close of their work, the chemistry of cellulose

> "is a province of applied chemistry where, as in many others, the distinctions between 'science' and 'practice' exist only in the minds of those who grasp neither the one nor the other. Manufacturers and technical men, if they will only take the trouble to inform themselves, must see that an enormous field of natural products and processes about to be explored has a number of industrial prizes and surprises in store ; scientific men who have to undertake the pioneering work in this field will find sufficient stimulus to effort in the promise of discovery."

H. E. A.

EARLY CHALDEAN CIVILIZATION.

Cuneiform Texts from Babylonian Tablets, &c., in the British Museum. Part I. By L. W. King, M.A. Printed by order of the Trustees. Pp. iv + 50 plates. (Kegan Paul, Longmans, and others, 1896.)

RUMOURS must have reached the general reader from time to time of the "finds" of tablets which have been made by the natives in Southern Babylonia ; and it is a matter for congratulation that, judging by what we see in the volume before us, the results of these "finds" have been acquired by the Trustees of the British Museum. We have long been familiar with tablets of Assyria and Northern Babylonia, and it has long been evident that their contents were taken from clay documents which belonged to a much older period, and were the literary offsprings of a people whose early history had then disappeared in the mists of a remote antiquity. The

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copies of the tablets, cones, &c., which Mr. King has just given us confirm this opinion, and we are brought face to face with a class of tablets to which, hitherto, we have been strangers. And just as the tablets are new to us, so, too, is their shape—for they are round, and resemble large bread-cakes more than anything else—and the eras in which they are dated are new, and the characters in which they are written are more complicated than any which we have hitherto seen. The texts upon them form public accounts and lists of revenue and produce which were drawn up for the public "record office" of the kings of the second dynasty of the city of Ur, about B.C. 2300; the kings most frequently mentioned are Bur-Sin, Ine-Sin and Gamil-Sin. Curiously, however, these tablets are not dated by regnal years, as are thousands and thousands of other documents, but by important events in the past history of the country, such as the capture of an enemy's city, or the invasion of an enemy, or the completion of some great public work, and unfortunately we have, at present, no means of telling *when* these events took place. Among the miscellaneous texts which Mr. King has given us we find a very important inscription in Accadian (No. 96-4-4, 2) containing an invocation to the goddess Nininsina to preserve the lives of Rim-Aku (Arad-Sin) and his father Kudur-Mabug, who flourished, probably before B.C. 2300, about one hundred years before Khammurabi succeeded in consolidating his kingdom in Babylonia. Another remarkable inscription is found on four clay "cones" (No. 96-6-12, 3), whereon we find recorded the name and titles of Mul-babbar, or if we read it as a Semitic name, Amêl-Shamash, a very early *patesi* or viceroy of Babylonia. We believe that this Mul-babbar is here met with for the first time. Still another most valuable text is found on the stone mace-head (No. 96-6-15, 1), where we have recorded a prayer to a god on behalf of one Nin-kagina, the son of Ka-azaggid, and of the viceroy under whom he served; the name of the latter is Nam-maghani, and he ruled over the city of Lagash, or Shirpurla, about B.C. 2500. It is an important fact that the name of Nin-kagina's father is given, and it would seem as if hereditary offices of high rank had already been established at that early period.

Want of space forbids our calling the reader's attention to many other important details in connection with these early texts; but it must be mentioned that their true value arises from the fact that they enable us to fill up part of the gap in our knowledge of the period which lies between the reigns of Khammurabi and Sargon I. of Agade. More than that, when worked out, these tablets will help us to understand the social fabric of the civilisation of the period, and will, no doubt, reveal the conditions of land tenure in Babylonia. It seems as if the land was managed for the kings or viceroys by the priests, and as if much of the administrative work of the country was deputed to them; that kings themselves also held priestly rank is also most probable. But although the forty tablets, &c., here published, yield so many results, it must never be forgotten that our knowledge of this period must be always fragmentary as long as a single tablet remains unpublished. We are very glad to see from the prefatory note to Mr. King's work, that other volumes of a similar character are to be issued by the Trustees of the British Museum, and we can only hope that the intervals between the appearance of the parts will not be long. They had already laid all cuneiform students under a debt of gratitude for their liberality in the publication of unremunerative books of Assyrian and Babylonian texts, and the present volume will make that debt greater.

In conclusion it may be mentioned that Mr. King's copies have been reproduced by photo-lithography, and that the work is therefore free from misprints which so often puzzle the reader, and lead him, sometimes, astray; the handwriting is clear, and neat, and careful—three qualities which should not be lightly esteemed.

HANDBOOKS OF PHYSIOLOGY.

Kirkes' Handbook of Physiology. By Prof. W. D. Halliburton, F.R.S. Fourteenth edition. Pp. 851. 8vo. (London: John Murray, 1896.)

IT is not very many years ago since "Kirke," as the book before us has been familiarly termed by many generations of students of medicine, had the field all to itself as a physiological handbook. During many years it had no rival; for the "Principles of Physiology" of the late Dr. W. B. Carpenter, although co-existent with it, was far too bulky to be regarded as in any sense a handbook. How different are matters in this respect now! What with Waller, Starling, McKendrick, Stewart, to say nothing of Foster, of Landois and Stirling, and of even bigger books looming in the distance, the student at the present day can take his choice; which he could not do then, for the only book offered to him in the days we are speaking of was the compilation by Dr. Kirkes, which, unlike most text-books, has been destined long to survive its original author. And an excellent compilation it was, founded upon the best work on physiology of its time, and, as some think, of all time, that by Johannes Müller; written, moreover, in a readable manner, so that the attention of the reader was easily maintained, and his interest in the subject never allowed to flag. But, alas! science is progressive, and a book on physiology may be ever so readable to-day but will not be read to-morrow, unless means are taken to bring its material "up to Saturday night." Thereafter comes the inevitable "editing," which may be all well enough so long as the author can himself undertake the repairs of his own fabric, but which is apt to render that fabric a very patchwork quilt of a book when it consists of the paste and scissors work of inserting a paragraph here and deleting a paragraph there, as was to all appearance the manner of preparing a good many of the round dozen of editions which intervened between the original book and the one we are considering.

The result was that the work became full of inconsistencies, amounting in some cases to grave errors; and at a certain period of its career it was so unfavourably regarded by the professors of physiology, that one of the most eminent of these is reported to have addressed his class in the following terms:—"If any gentleman present has purchased a copy of a book called 'Kirkes' Physiology,' I would advise him to take it out with him when he goes for a walk . . . and throw it over the highest

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